

Climate System Observations and Analysis



Taneil Uttal

Polar (Arctic) Observations and Processes



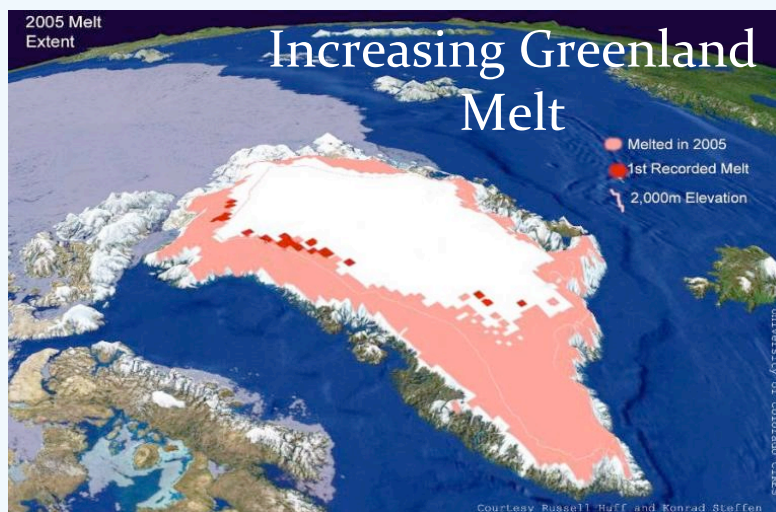
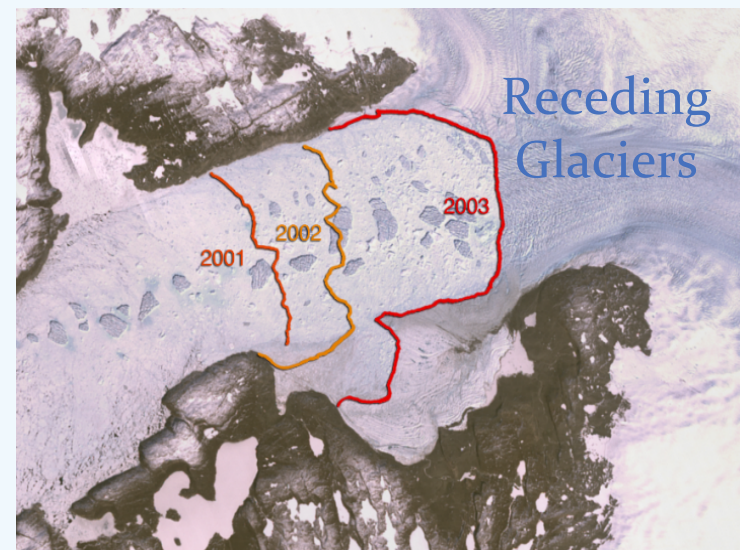
Mission

To understand the (anthropogenic) atmospheric component of the Arctic System in particular impact (feedbacks) on sea ice extent, permafrost, snow distribution, glacier mass, and human systems

Understanding WHY, not just HOW
the Arctic climate system changing so fast

Developing the foundation for the Arctic
component of a Climate Service

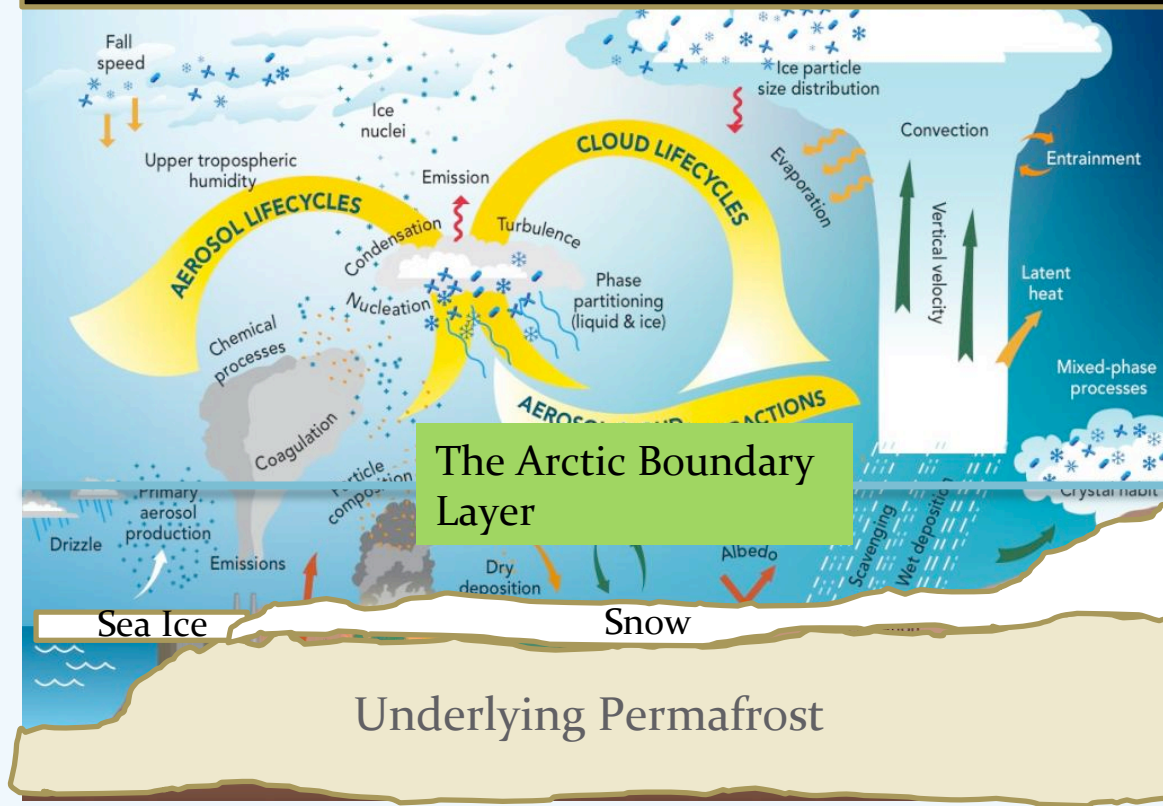






Complicated Processes with Unique Arctic Twists

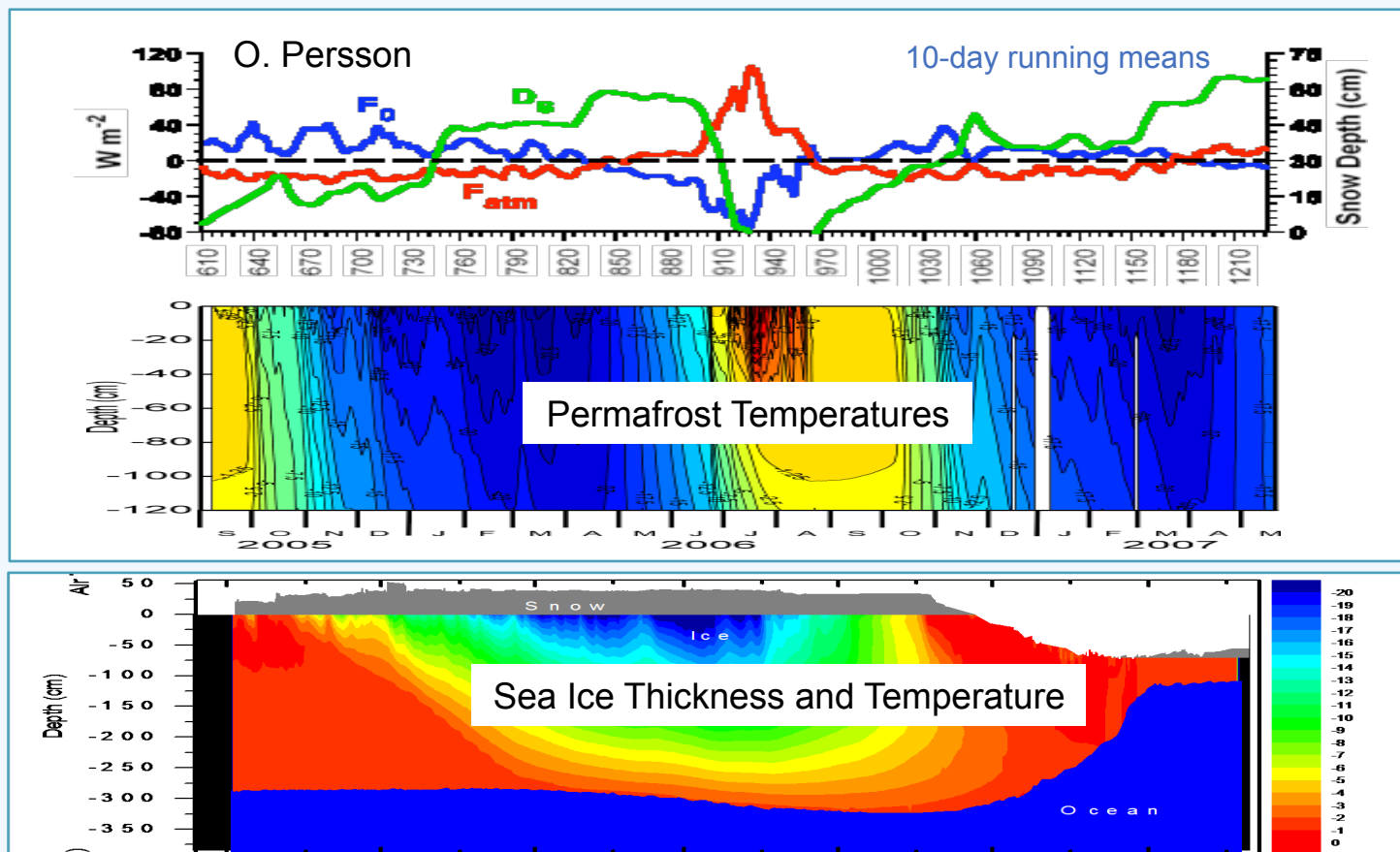
The annual cycle is like one long diurnal cycle





Proposed Approach: Have an Observational System with Clearly Defined Products That Allows for Surprises

Atmospheric Fluxes (F_{atm}), Snow Depth (D_s), Surface Flux (F_o)





Major Observation Programs

ASCOS – Arctic Summer Cloud Ocean Study



Integrated Characterization of Energy, Clouds, Atmospheric State, and Precipitation at Summit (ICECAPS)



Tiksi Hydrometeorological Observatory

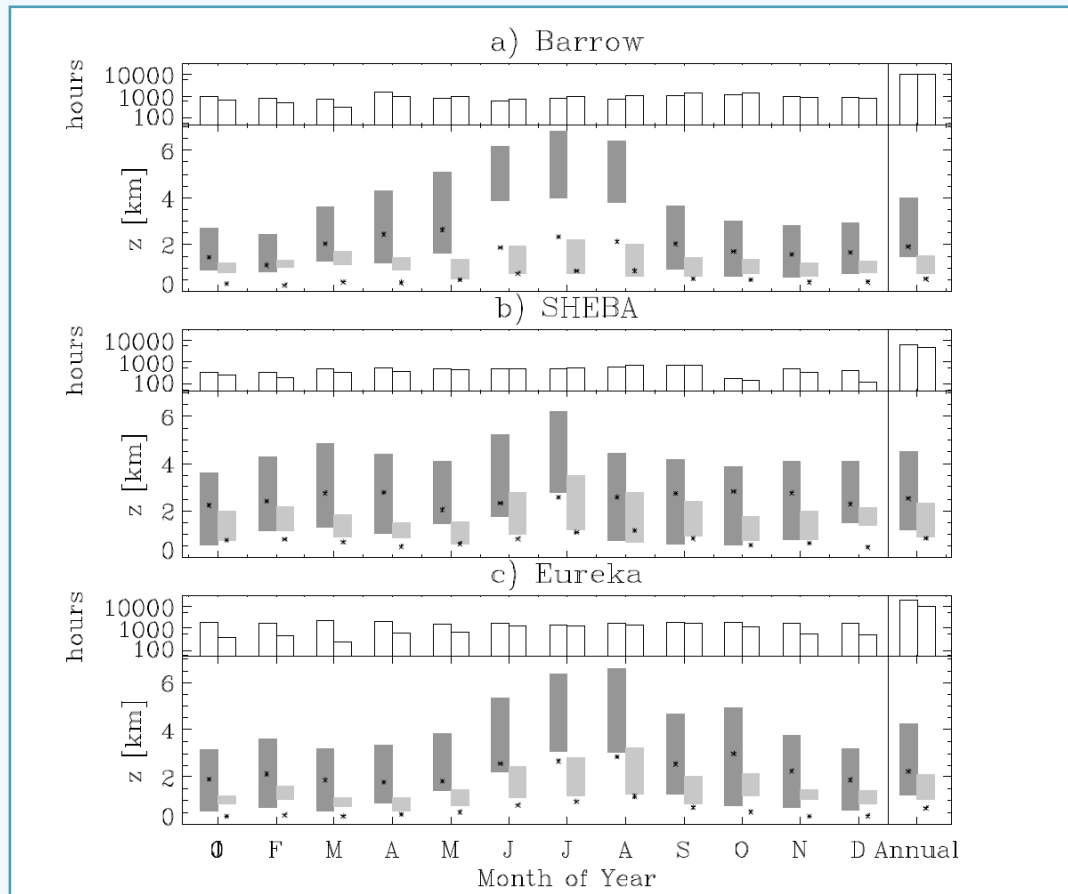


Eureka and Alert Canada





Major Science Themes



- Clouds and Aerosols
- Surface Energy Balances
- Transport Studies

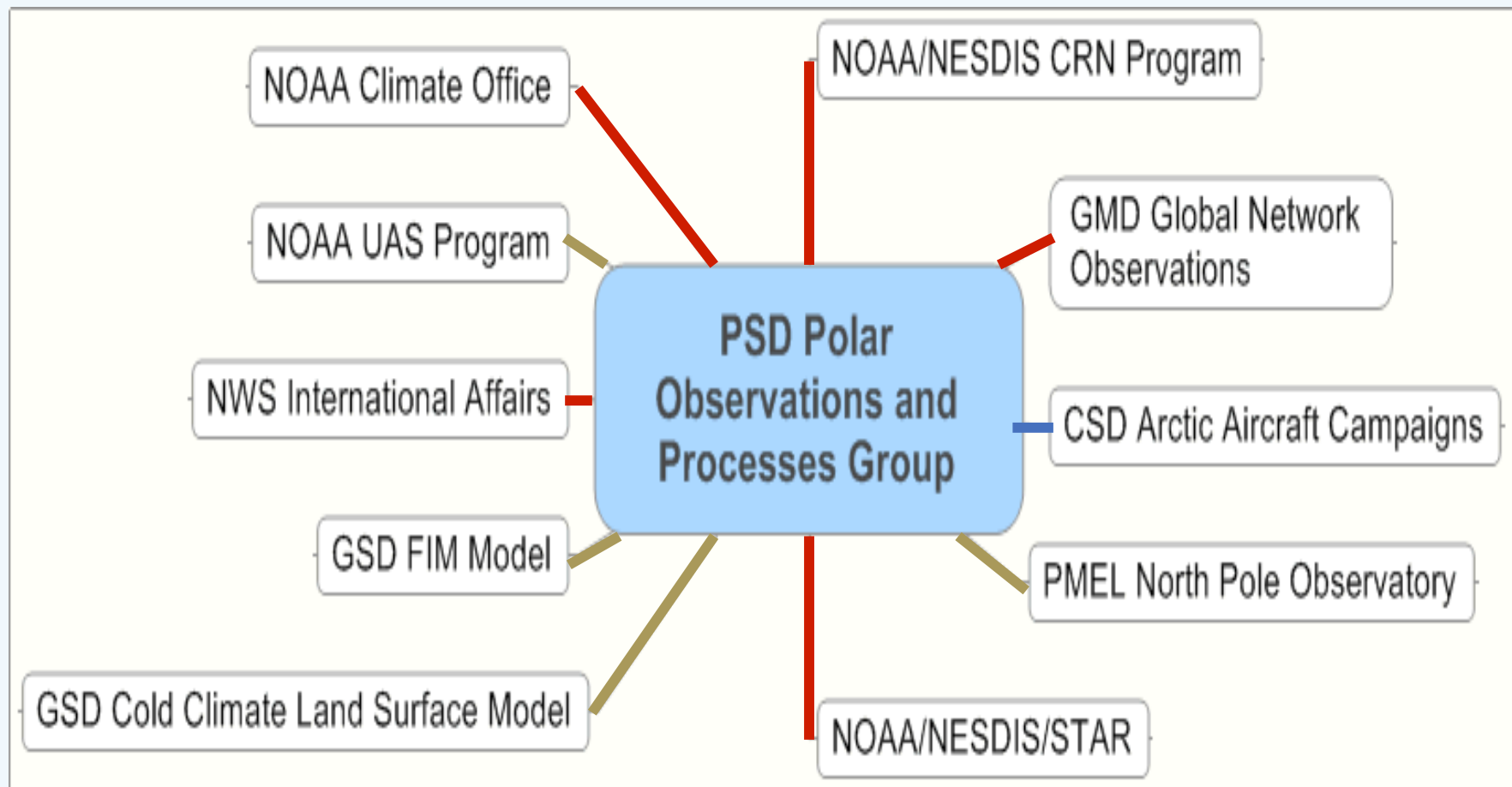
M. Shupe

Example: Annual cycle of cloud base and top for ice and liquid clouds

Note: Critical cloud information, 3 sites in widely distributed Arctic regimes,
Long-term (12 years, 1 year, 5 years) data sets



NOAA Linkages



— Strong Existing Linkages — Potential Linkages





Interagency Linkages

Atmospheric System Research (ASR)
Science and Program Plan

January 2010



Office of Science

DOE Atmospheric Science Plan

Studies of Environmental Arctic Change Observing Change Panel

STUDY OF ENVIRONMENTAL ARCTIC CHANGE

Panels **Observe**

Observing Change | Understanding Change | Responding to Change

Observing Change Panel Members (as of December 2009)

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U.S. Policy Linkages

U.S. DEPARTMENT OF STATE
DIPLOMACY IN ACTION

SECRETARY CLINTON MEDIA CENTER TRAVEL CAREERS BUSINESS YOUTH & EDUCATION

ABOUT STATE POLICY ISSUES COUNTRIES & REGIONS ECONOMICS & ENERGY ARMS CONTROL & SECURITY DEMOCRACY & GLOBAL AFFAIRS PUBLIC DIPLOMACY & PUBLIC AFFAIRS ASSISTANCE & DEVELOPMENT

Home » Under Secretary for Democracy and Global Affairs » Climate Change » Bilateral Climate and Environmental and Scientific Policy Dialogue Working Group

U.S.-Russia Climate Change Policy Dialogue Working Group

On January 17, 2003, The United States and the Russian Federation agreed to broaden their global climate change cooperation by promoting a Climate Change Policy Dialogue to intensify and strengthen their efforts, including through a Climate Change Working Group to facilitate the Dialogue process. The third meeting of the U.S.-Russia Climate Change Policy Dialogue Working Group was held in Moscow on May 31, 2005. The two countries have made progress on a number of topics, including:

- Joint projects on research of the Arctic and Antarctic climate within the framework of the International Polar Year 2007/08
- Development of the Roshydromet-NOAA project to create a joint Tiksi climate monitoring station;
- Developing a system of oceanographic observations in the Arctic; Assessment and diagnostics of the Arctic climate calculation results with the IPCC models; and detecting changes in climate state, climate variability and climate extremes.
- Collaboration of U.S. and Russian scientific organizations within the framework of the Arctic Climate Impact Assessment and SMIP2 project (Seasonal Prediction)

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Development of the Roshydromet-NOAA project to create a joint Tiksi climate monitoring station





International Linkages Past and Future



International Polar Year
March 2007 – March 2009



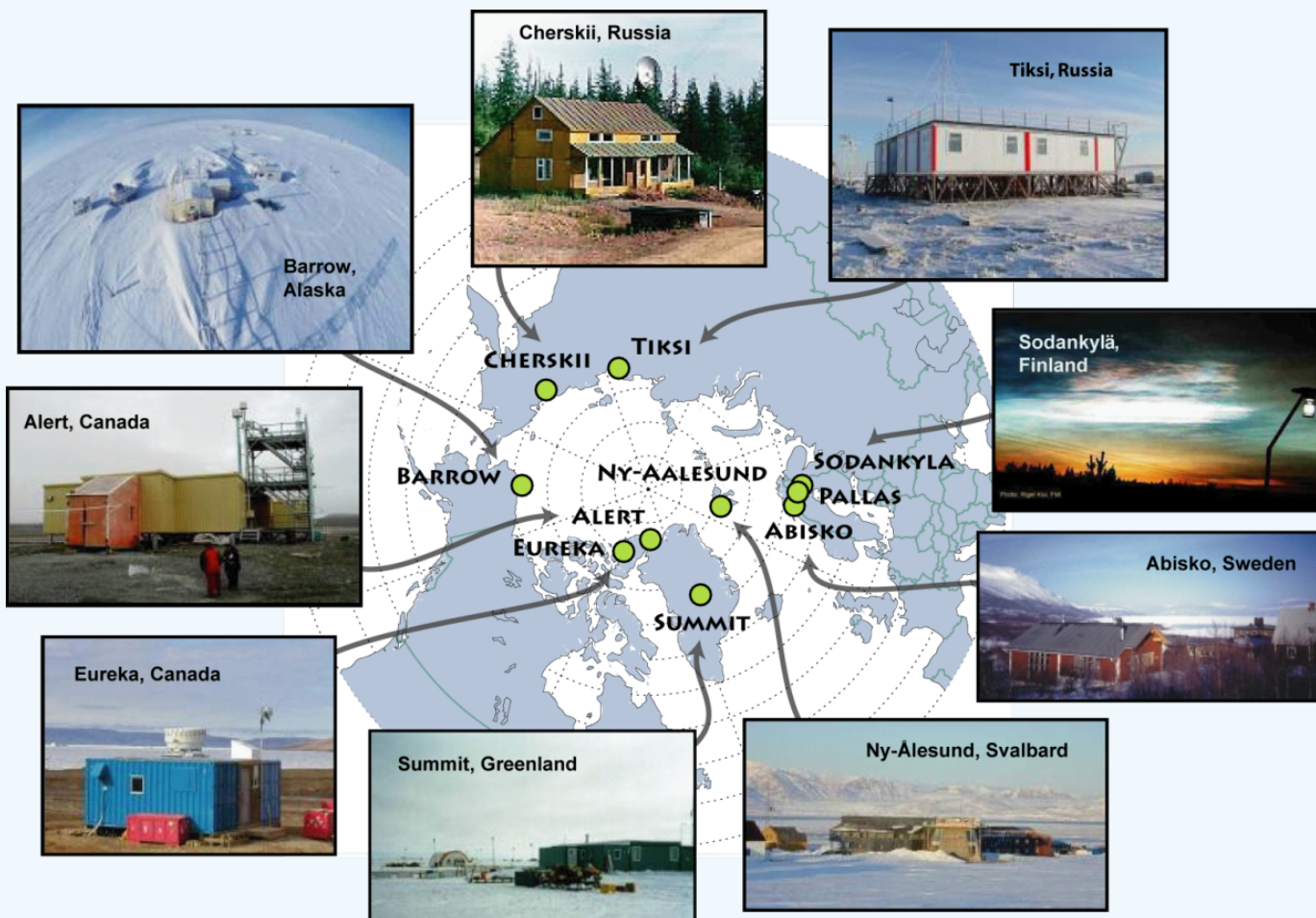
ARCTIC COUNCIL

Sustained Arctic Observing Network



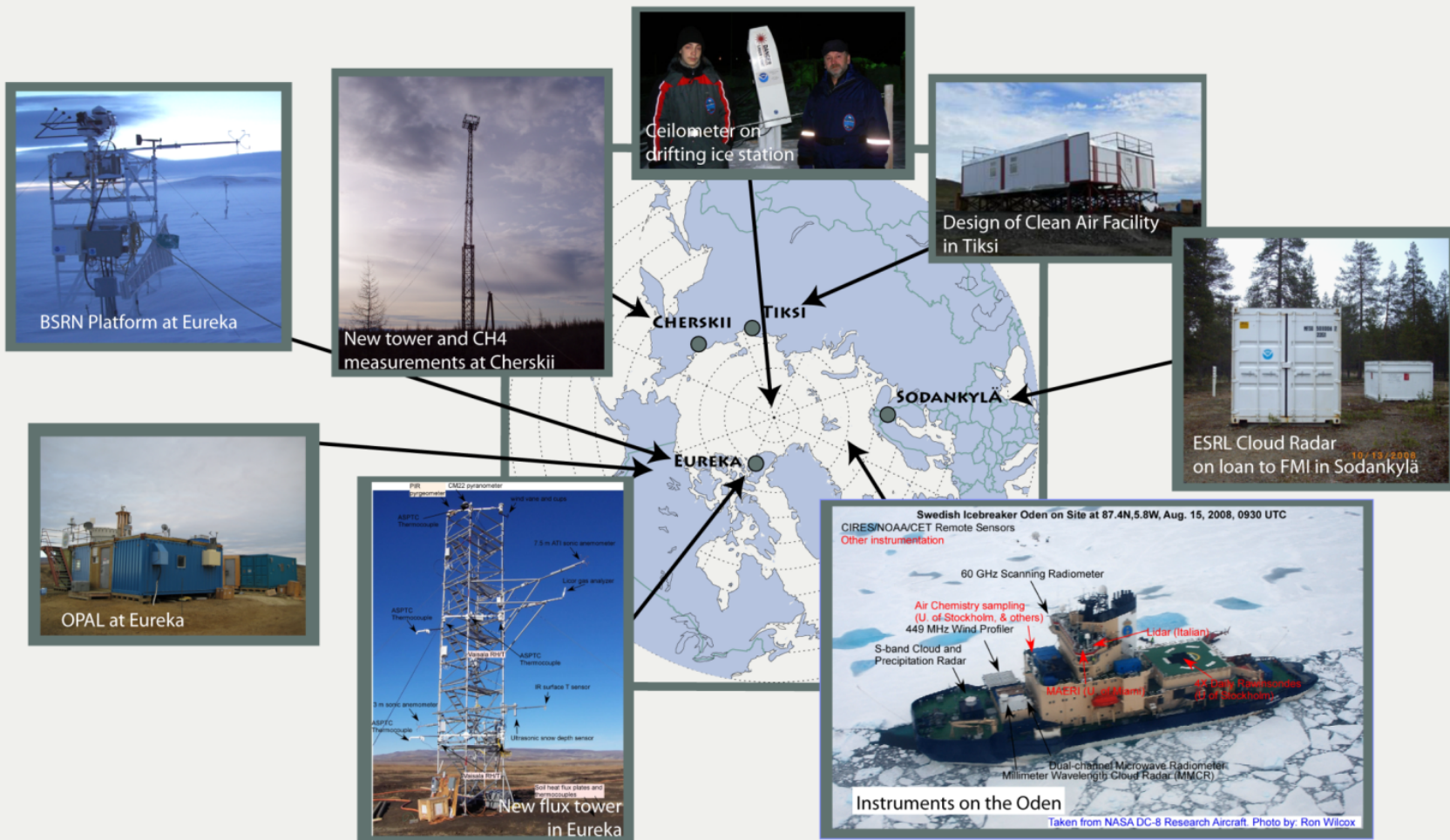
International Links

www.iasoa.org





Examples of NOAA Infrastructure Contributions to Pan-Arctic Climate Observatories in non-U.S. Territories



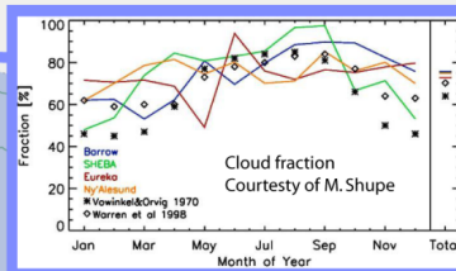
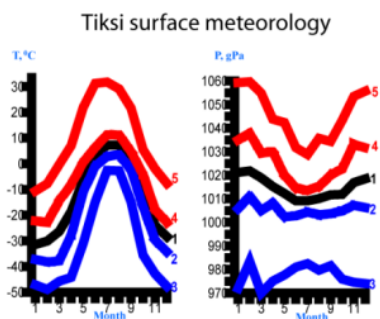


NOAA SEARCH Arctic Atmospheric Science

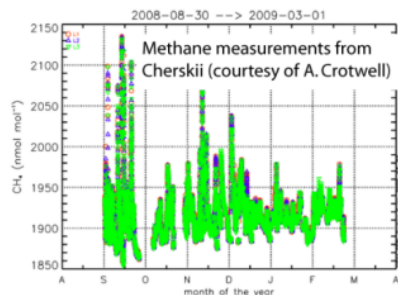


Historical meteorological data at Tiksi has been digitized, making it easier to perform climatological analysis of surface data

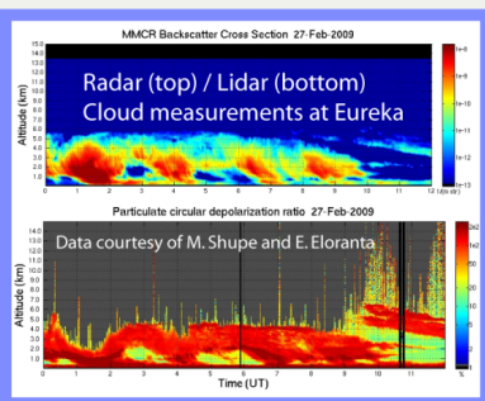
Courtesy of A. Makhtas



Cloud fraction
Courtesy of M. Shupe



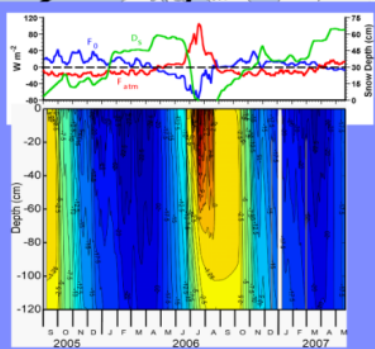
Methane measurements from
Cherskii (courtesy of A. Crotwell)



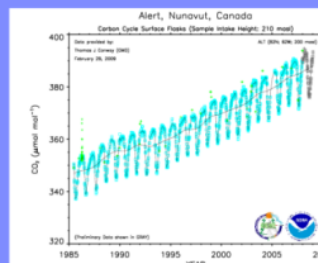
Radar (top) / Lidar (bottom)
Cloud measurements at Eureka

Particulate circular depolarization ratio 27-Feb-2009

Data courtesy of M. Shupe and E. Eloranta



Annual cycle of GAW
soil temperatures at Alert
(courtesy of O. Persson)



CO2 measurements at the
Alert GAW station
(data courtesy of ESRL/GMD web site)



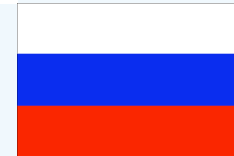


A Program Critically Dependant on Partnerships



Environment
Canada

Environnement
Canada



University of Idaho

